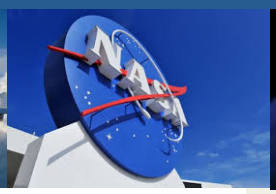
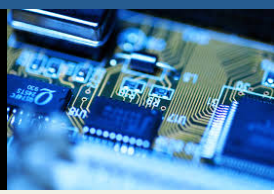
Technology Opportunity







NASA JPL

Resonator Optical Waveguide and Methods

A vertically-coupled whispering gallery mode resonator waveguide and its application as an optical delay line

Marketing Summary

Communication networks requiring higher bandwidth use optical fiber transmission because it has greater data-carrying capacity than electrical transmission. Despite the optical advantage, routing and switching—operations that are essential for sending information to the correct destination—are still performed by inefficient electronic circuits that struggle to keep up. As we exploit ever-greater bandwidths, our need for an optical delay line that can efficiently route and switch optical pulses grows stronger. Innovators at JPL have developed the vertically-coupled whispering gallery mode resonator optical waveguide to address this need.

Technology

An integral, one-piece optical waveguide can be made by turning a cylindrical rod of optically transparent material and removing material from the rod at preset distances along a longitudinal direction. This forms a chain of ring-shaped whispering gallery mode resonators, which can be coupled through the evanescent field inside the rod. The decay constant of the evanescent field depends on the shape of the resonators and the distance between them. Light can be coupled into a mode of one of the resonators by directing the light into an optical coupler arranged in the vicinity of a resonator and then forming an evanescent field inside the rod. The group velocity of light can be reduced by sequentially coupling each of the remaining resonators.

Benefits

- Stable in all environments
- Easy to fine-tune
- Simple one-piece fabrication

Applications

- Fiber optic networks
- Radar technologies

Technology Status

- ☐ Patent Pending
- ☑ U.S. Patent (7,184,624)
- ☐ Copyrighted
- ☑ Available to license
- ☐ Available for no-cost transfer
- ☐ Seeking industry partner for further co-development

If your company is interested in licensing or joint development opportunities associated with this technology, or if you would like additional information on partnering with NASA, please contact:

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